McIntosh
C 29

OWNER'S MANUAL

THE C 29 SOLID STATE STEREO PREAMPLIFIER

Reading Time: 38 Minutes

Price: $2.00

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VARIOUS REGULATORY AGENCIES REQUIRE THAT WE BRING THE FOLLOWING FORMATION TO YOUR ATTENTION. PLEASE READ IT CAREFULLY.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

The McIntosh you have purchased is a C 29 Preamplifier. It has a serial number located on the rear panel of the chassis. Record that serial number here:

Serial Number

The model, serial number and purchase date are important to you for any future service. Record the purchase date here:

Purchase Date

Upon application, McIntosh Laboratory provides a Three-Year Service Contract. Your McIntosh authorized Service Agency can expedite repairs when you provide the Service Contract with the instrument for repair. To assist, record your Service Contract number here:

Service Contract Number

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Your C 29 Preamplifier will give you many years of pleasant and satisfactory performance. If you have any questions, please contact:

CUSTOMER SERVICE
McIntosh Laboratory Inc.
2 Chambers Street
Binghamton, New York 13903-9990
Phone: 607-723-3512

Take Advantage of 3 years of Contract Service . . . Fill in the Application NOW.

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McINTOSH THREE YEAR SERVICE CONTRACT

An application for a THREE YEAR SERVICE CONTRACT is included with this manual.

The terms of the contract are:

1. McIntosh will provide all parts, materials and labor needed to return the measured performance of the instrument to the original performance limits. The SERVICE CONTRACT does not cover any shipping costs to and from the authorized service agency or the factory.
2. Any McIntosh authorized service agency will repair McIntosh instruments at normal service rates. To receive service under the terms of the SERVICE CONTRACT, the SERVICE CONTRACT CERTIFICATE must be presented when the instrument is taken to the service agency.
3. Always have service done by a McIntosh authorized service agency. If the instrument is modified or damaged, as a result of unauthorized repair the SERVICE CONTRACT will be cancelled. Damage by improper use or mishandling is not covered by the SERVICE CONTRACT.
4. The SERVICE CONTRACT is issued to you as the original purchaser. To protect you from misrepresentation this contract cannot be transferred to a second owner.
5. To receive the SERVICE CONTRACT your purchase must be made from a McIntosh franchised dealer.
6. Your completely filled in application for a SERVICE CONTRACT must be postmarked within 30 days of the date of purchase of the instrument.
7. To receive the SERVICE CONTRACT all information on the application must be filled in. The SERVICE CONTRACT will be issued when the completely filled in application is received at McIntosh Laboratory Inc. in Binghamton, New York.

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Installation

The PANLOC system of installing equipment conveniently and securely is a product of McIntosh research. By depressing the two PANLOC buttons on the front panel, the instrument slide can be locked firmly in place or it can be unlocked so that the chassis can slide forward, giving you easy access to the top and rear panels.

The trouble-free life of an electronic instrument is greatly extended by providing sufficient ventilation to prevent the buildup of high internal temperatures that cause deterioration. Allow enough clearance so that cool air can enter at the bottom of the cabinet and be vented from the top. With adequate ventilation the instrument can be mounted in any position. The recommended minimum space for installation is 15 inches (38.1 cm) deep, 17 inches (43.2 cm) wide, and 6 inches (15.2 cm) high.

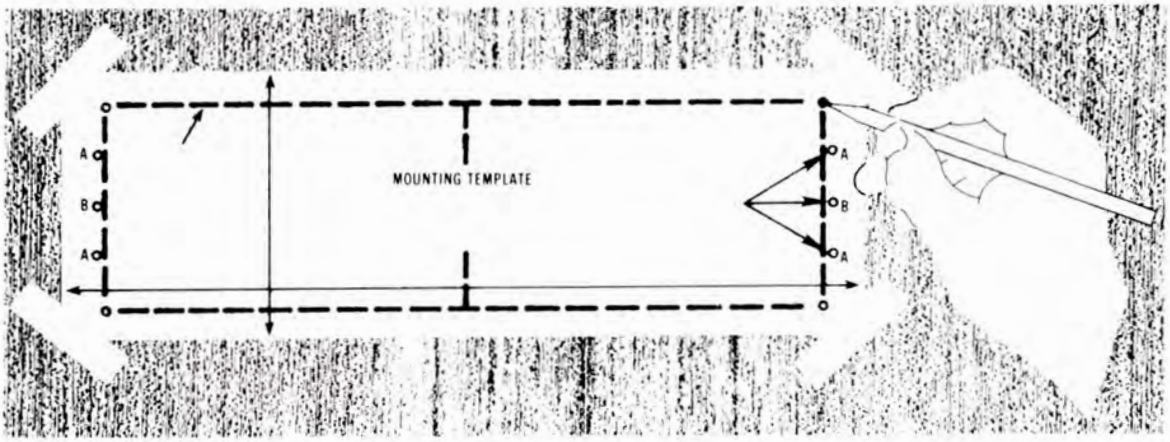
To install the instrument in a McIntosh cabinet, follow the instructions that are enclosed with the cabinet. For any other type of installation follow these instructions:

1. Open the carton and remove the PANLOC brackets, hardware package, and mounting template from the carton. Remove the C 29 from its plastic bag and place it upside down on the shipping pallet; unscrew the four plastic feet from the bottom of the chassis.

2. Mark the cabinet panel.
Place the mounting template in the position on the cabinet panel where the instrument is to be installed, and tape it in place. The broken lines that represent the outline of the rectangular cutout also represent the outside dimensions of the chassis. Make sure these lines clear shelves, partitions, or any equipment. With the template in place, first mark the six A and B holes and the four small holes that locate the corners of the cutout. Then, join the four corner markings with pencil lines, using the edge of the template as a straightedge.

3. Drill Holes
Use a drill with a 3/16 inch bit held perpendicular to the panel and drill the six A and B holes. Then, using a drill bit slightly wider than the tip of your saw blade, drill one hole at each of two diagonally opposite corners. The holes should barely touch the inside edge of the penciled outline. **Before taking the next step, make sure that the six A and B holes have been drilled.**

4. Saw the Panel Cutout
Saw carefully on the inside of the penciled lines. First make the two long cuts and then the two short cuts. After the rectangular opening has been cut out,



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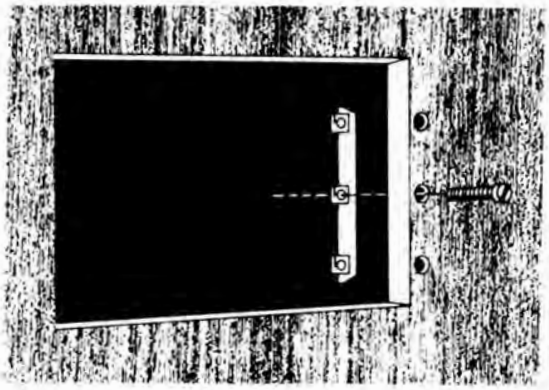

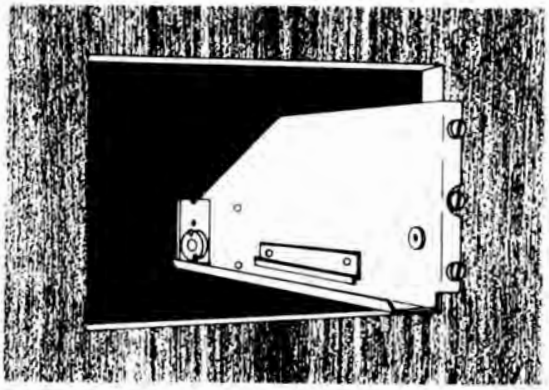

use a file to square the corners and smooth any irregularities in the cut edges.

5. Install the Mounting Strips

In the hardware package you will find two mounting strips, and two sets of machine screws. For panels that are less than 1/2 inch thick, use the 3/4 inch screws; for panels that are more than 1/2 inch thick, use the 1-1/4 inch screws.

Starting at the right-hand side of the panel, insert a screw of the proper length into the center hole in the panel, marked B on the template. On the back of the panel, align a mounting strip with the holes in the panel and tighten the screw until the screwhead is pulled into the wood.

Repeat this procedure to attach the mounting strip to the left side of the panel.

6. Attach the PANLOC Brackets

Using two screws of the proper length in the A holes on each side, attach the PANLOC brackets to the cabinet panel; the short flange is mounted against the front (face) of the cabinet panel. The screws pass through the PANLOC bracket flange, the cabinet panel, and then through the mounting strips previously mounted.

7. Install the Instrument

Guide the AC power cord through the panel opening to the back of the cabinet; then, slide the instrument into the opening carefully so that the rails on the bottom of each side of the chassis engage the tracks on the mounting brackets. Continue to slide the instrument into the cabinet until it is stopped by the adjust position latches. Press the latches inward, this permits the instrument to slide into the cabinet until its front panel is flush with the cabinet panel. Depress the PANLOC buttons at the lower left and right corners of the instrument panel to lock the unit firmly in the cabinet. Depressing the PANLOC buttons again will unlock the instrument so that it can slide forward to the adjust position; if you press inward on the adjust position latches then you can remove the instrument from the cabinet.

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How to Connect

Rear panel input jacks are provided for 2 stereo high level sources (AUX 1 and AUX 2), a stereo tuner (TUNER), 2 stereo turntables (PH 1 and PH 2), stereo high impedance microphones (MIC), and 2 stereo tape recorders (TAPE 1 and TAPE 2).

Rear panel output jacks are provided to feed 2 stereo tape recorders (TAPE 1 and TAPE 2), a stereo 600 ohm unbalanced line (LINE) and 2 stereo 2.5 volt outputs (MAIN).

Front panel jacks provide input and output facilities for a tape recorder using the circuits of the rear panel TAPE 2 connections. Two headphone jacks are provided which are fed by a stereo amplifier in the C 29.

CONNECTING AUX 1 AND AUX 2

Connect the left channel cable from any high level source (tuner, TV set, tape recorder, etc.) to the INPUT AUX 1 left jack. Connect the right channel cable to the INPUT AUX 1 Right jack. A second high level source can be connected similarly to INPUT AUX 2.

CONNECTING TURNTABLES

The C 29 has shorting plugs in the phono inputs. To prevent unwanted noise remove the shorting plugs only from input jacks that are to be used. Connect the cable from the left channel of the turntable into the INPUT PHono 1 left jack. Connect the cable from the right channel of the turntable into the INPUT PHono 1 Right jack. For a second turntable, connect PHono 2 in the same way, after removing the shorting plugs.

CONNECTING MICROPHONES

Connect the cables from high impedance microphones directly in the INPUT MIC Left and Right jacks.

CONNECTING TAPE RECORDERS

To Record:

Connect a cable from the OUTPUT TAPE 1 Left jack to the left high level input of the tape recorder. Connect a cable from the OUTPUT TAPE 1 Right jack to the right high level input of the tape recorder. Connect a second recorder in the same manner to the OUTPUT TAPE 2 jacks.

To Playback/Monitor:

Connect a cable from the left channel output of a tape recorder to the TAPE INPUT 1 Left jack. Connect a cable from the right channel output of a tape recorder to the TAPE INPUT 1 Right jack. Connect a second recorder in the same manner to the TAPE INPUT 2 jacks.

Front Panel Tape Recorder Jacks:

Tape recorder inputs and outputs are available at the TAPE IN-OUT jacks on the front panel just to the left of the TAPE MONITOR pushbuttons. These jacks make connections to TAPE 2 facilities without having to go to the rear panel. A metal shielded 1/4 inch stereo phone plug is used. Connections are tip: left signal, ring: right signal, and sleeve: common ground.

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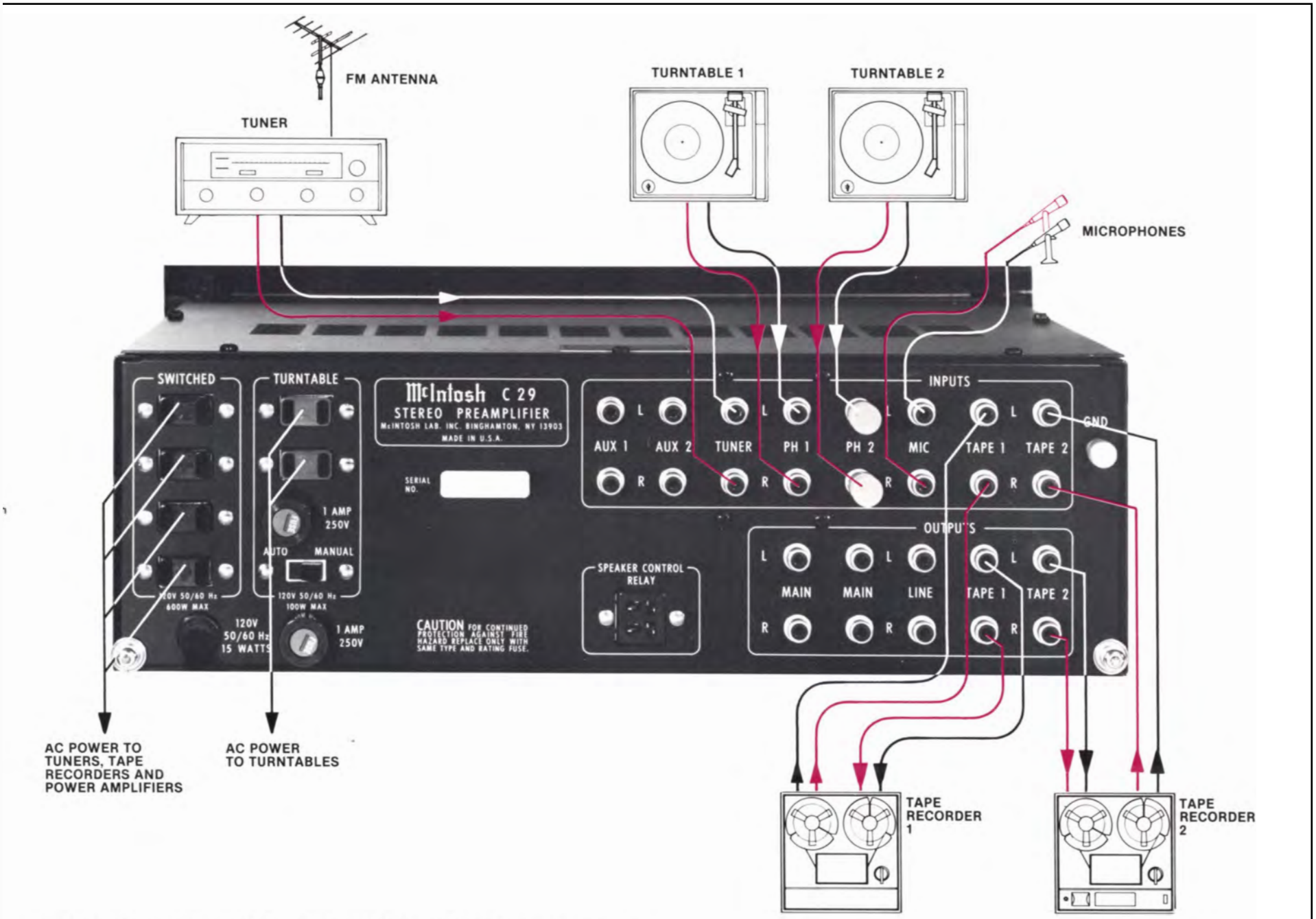

CONNECTIONS FOR TUNERS, TURNTABLES, AND TAPE RECORDERS

When a tape recorder is plugged into the front jacks all the facilities normally associated with TAPE 2 on the rear panel are automatically transferred to the front panel jacks.

CONNECTING TO POWER AMPLIFIERS

Connect the jacks labeled "OUTPUTS MAIN" to the input of a stereo power amplifier. The Left MAIN jack is connected to the left amplifier input jack. The Right MAIN jack is connected to the right amplifier input jack.

Cables are supplied to interconnect the C 29 to the power amplifier. Longer cables can be used if needed. The length of the cable is limited by the capacitance of the cable. The total cable capacitance must not exceed 1,000 pF. For instance: cables with a capacity of 25 pF per foot may be 40 feet long. 13.5 pF per foot cable may be 75 feet long. The input impedance of the amplifiers should be 10k ohms or greater.

A second pair of MAIN OUTPUT jacks have been supplied to feed a second power amplifier. In the event it is desired to tape record after the tone, filter, and volume controls the second set of OUTPUT MAIN jacks can be connected to the tape recorder input. The controls are then all available to control the signal before recording. Remember, any change in the setting of the controls will change the program to the tape recorder. Since the recording signal available at the OUTPUT MAIN is much higher than the output available from the OUTPUT TAPE 1 or TAPE 2 jacks, it will be easy to over-load the tape recorder input. In this mode of operation, it will not be possible to monitor from the tape recorder via the TAPE MONITOR pushbuttons while feeding the recorder from the OUTPUT MAIN jacks. Depressing the TAPE MONITOR pushbutton will disconnect the program source and may cause feedback oscillation.

SPEAKER CONTROL RELAY

To control loudspeakers by use of SPEAKERS 1 and 2 pushbuttons on the front panel an accessory McIntosh SPEAKER CONTROL RELAY is needed. Plug the special cable from the SPEAKER CONTROL RELAY into the C 29 back panel SPEAKER CONTROL RELAY receptacle. In addition to loudspeaker connections and switching, the SPEAKER CONTROL RELAY has two AC power outlets that provide additional capacity of 2400 watts. Use these outlets to supply AC power to amplifiers or other components whenever the total load to be switched by the C 29 exceeds its rating of 600 watts.

CONNECTING AC POWER

The preamplifier AC power cord is plugged into a 120 volt 60 Hz wall outlet.

There are two types of AC power outlets on the back panel: four black and two green.

The green AC power outlets are on at all times. Plug the AC power cables from the turntable into the green TURNTABLE power outlets on the rear panel. The black outlets are switched on and off when the preamplifier is turned on or off. These are intended for power amplifiers, equalizers and other accessories up to 600 watts total capacity.

The POWER ON pushbutton shares AC power control with the AC power switch on a turntable, through a current detecting switch circuit. On the rear panel the TURNTABLE AUTO/MANUAL switch selects the mode of operation. When the switch is in the AUTO position and a turntable is plugged into one of the green AC power outlets, the AC power to the preamplifier and to the black AC power outlets can be controlled by the turntable on/off switch. When AC power to the turntable is turned on, automatically the preamplifier and the switched black AC power outlets are turned on. The system will remain on until the turntable is turned off. The POWER ON pushbutton controls the AC power for any source other than the turntable.

In the MANUAL position only the POWER ON pushbutton will turn AC power on or off.

Some turntables have electronic circuits that draw current all the time. To use these turntables the AUTO/MANUAL switch must be in the MANUAL position. With the AUTO/MANUAL switch in the MANUAL position, AC power to the system will be controlled by the front panel POWER pushbutton only.

The green AC power outlets are protected with a one ampere fuse. Any increase in the value of this fuse will affect the protection of the sensing circuit and can cause damage.

CONNECTING PROGRAM SOURCE GROUNDS

A single GROUND post is provided to which grounds for turntables, record changers, tape decks, etc. are connected. To prevent hum pickup, the left and right program cables and the ground wire from that source should be wound or twisted together. Make sure the ground wire does not make any connection to the shields of the left and right program cables between the source and the input of the preamplifier.

FUSES

A 1.0 AMP fuse protects the preamplifier circuits. The fuse does not protect additional equipment connected to the back panel AC outlets.

The green AC power outlets are protected with a one ampere fuse. Any increase in the value of this fuse will affect the protection of the sensing circuit and can cause damage.

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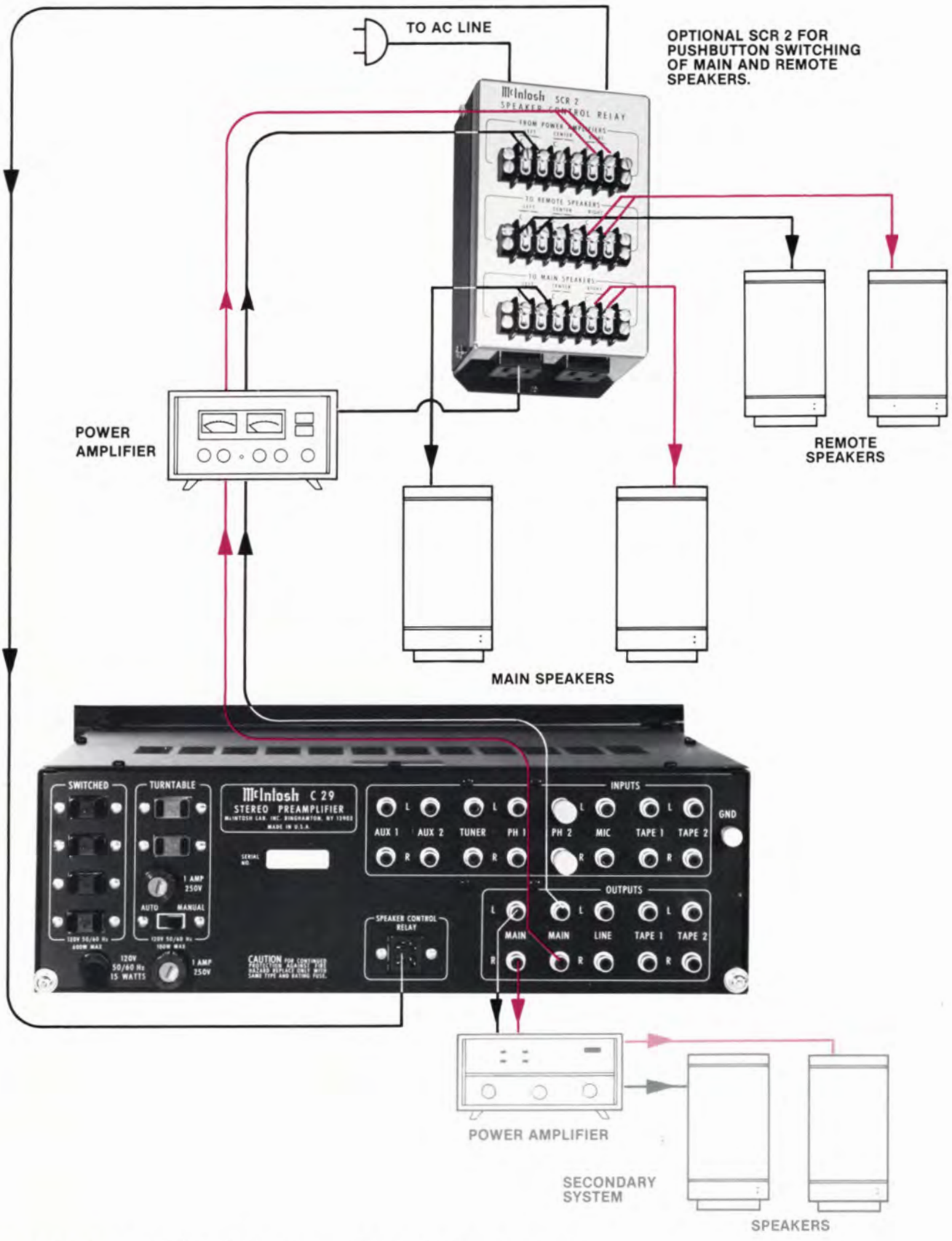

CONNECTIONS FOR POWER AMPLIFIERS AND LOUDSPEAKERS

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The Front Panel Controls and How to Use Them

BALANCE and LOUDness

The BALANCE and LOUDness controls are concentric. The BALANCE control (large outer knob) adjusts for equal volume of either the left or right channels. The volume of the channels can be varied relative to each.

left . . . turning the control to the left accents the left channel by reducing the right channel output.

right . . . turning the control to the right accents the right channel by reducing the left channel output.

LOUDness

Use the LOUDness control for full frequency range listening at even the softest listening levels. The LOUDness control (the small center knob of the concentric control) provides low-frequency boost to compensate for a hearing characteristic of the human ear at low listening levels. The ear becomes less sensitive to low frequencies as volume is reduced. Increased loudness compensation is therefore desirable at lower listening levels. The loudness control boosts the low frequencies so that the ear hears approximately the same musical balance as it would at higher listening levels.

FLAT: (Maximum counterclockwise rotation) Full volume with flat frequency response. The loudness compensation is inoperative in this position.

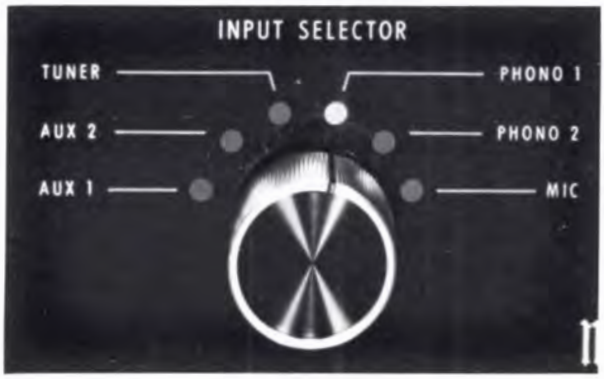
Turning the control clockwise toward MAX reduces the listening volume, and automatically increases the compensation by boosting bass.

INPUT SELECTOR

The six position INPUT SELECTOR controls the input program. When the INPUT SELECTOR is turned to:

AUX 1: the output from any high level program source requiring flat amplification is connected to the high level input stage. Such a source could be another tape recorder, or a television set.

AUX 2: same as AUX 1



TUNER: the output from any AM, FM or MPX FM tuner is connected to the high level input stage. In the TUNER position the C 29 has flat amplification.

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PHono 1: the output of a magnetic phono cartridge plugged into PHono 1 is connected to the low level amplifying stages. The response of these stages has been shaped to precisely conform to revised RIAA standards.

PHono 2: Same as PHono 1

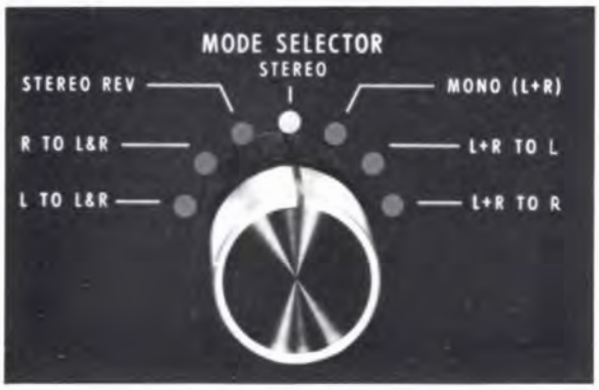
MIC: the output of any high impedance microphone is connected to the low level input stage. In the MIC position the C 29 has flat amplification.

MODE SELECTOR

The MODE SELECTOR facilitates the accurate adjustment of a stereo system for some differences caused by room acoustics, loudspeaker placement and the other components used in the system.

The MODE SELECTOR switch connects the program to the loudspeaker in seven ways:

L to L and R: Connects the left program to both loudspeakers.



R to L and R: Connects the right program to both loudspeakers.

STEREO REV: Connects the left program to the right loudspeaker and the right program to the left loudspeaker.

STEREO: Connects the left program to the left loudspeaker and the right program to the right loudspeaker.

MONO (L + R): Adds the left and right programs together and connects to both loudspeakers.

L + R to L: Connects the left plus right program to the left loudspeaker only.

L + R to R: Connects the left plus right program to the right loudspeaker only.

VOLUME CONTROL

The VOLUME control is a precision step control manufactured for McIntosh Laboratory. It has 32 steps with a 70 dB range, plus volume off. Left and right channel tracking are within 1 dB. This extreme accuracy is obtained through special electronically controlled resistance element trimming.

BASS

Concentric, 11 position, tone control switches adjust the bass. The outer knob adjusts the right channel bass response. The inner knob adjusts the left channel bass response.

Left: Adjusts the bass loudness from the left loudspeaker. Clockwise rotation increases the bass loudness while counterclockwise rotation decreases the bass loudness. Each step of the tone control adjusts the bass loudness about 4 dB.

Right: Has the same effect on the sound from the right loudspeaker.

TREBLE

Concentric, 11 position, tone control switches adjust the treble. The outer knob adjusts the right

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channel treble response. The inner knob adjusts the left channel treble response.

Left: Adjusts the treble loudness from the left loudspeaker. Clockwise rotation increases the treble loudness while counterclockwise rotation decreases the treble loudness. Each step of the tone control adjusts the treble loudness about 4 dB.

Right: Has the same effect on the sound from the right loudspeaker.

TAPE PUSHBUTTONS

IMPORTANT: When the C 29 is operated with either MONITOR pushbutton at the in position, the program heard will be that from the tape recorders only. Signal from any other source will not be heard from the loudspeakers. To hear any other source, make sure the MONITOR pushbuttons are OUT.

The MONITOR switches are mechanically interlocked to prevent simultaneous monitoring from two tape recorders. If one button is at the in position, it must be pushed again to release it to the out position before the other button can be pushed.

The C 29 is designed so it may be used with two tape recorders. The four left pushbuttons control the signal output of these recorders. They permit recordings to be monitored as they are being recorded, or copying of tapes from one recorder to another while listening to a separate program or the playback of either recorder.

MONITOR TAPE 1 pushbutton out: The program source as selected by the INPUT SELECTOR is fed to the power amplifiers and heard through the loudspeakers; pushbutton in: Signal from a tape recorder plugged into INPUTS TAPE 1 is fed to the power amplifiers and heard through the loudspeakers.

MONITOR TAPE 2 pushbutton: Functions similarly to monitor Tape 1. It also controls the program from a tape recorder plugged into the front panel TAPE IN and OUT jacks. When a tape recorder is plugged into the front jacks all the facilities normally fed to TAPE 2 on the rear panel are automatically transferred to the front panel. The tape recorder plugged into the TAPE 2 IN and OUT jacks on the rear panel is automatically disconnected.

TAPE COPY T1 → T2 pushbutton in: connects the output from tape recorder 1 to the input of tape recorder 2 without affecting the program being heard from the speakers. In this position a copy of the program on tape recorder 1 can be made on tape recorder 2. To monitor the original use MONITOR TAPE 1 pushbutton and to monitor the copy use MONITOR TAPE 2 pushbutton.

TAPE COPY T2 → T1 pushbutton in: connects the output from tape recorder 2 to the input of tape recorder 1 without affecting the program being heard from the speakers. In this position A copy of tape program on recorder 2 can be made on recorder 1. To monitor the original use MONITOR TAPE 2 pushbutton and to monitor the copy use MONITOR TAPE 1 pushbutton.

LF-HF FILTERS

Use the LF-HF FILTERS pushbutton to reduce objectionable low and high frequency noises (below 50 Hz and above 7 kHz). With the pushbutton in, noise is reduced; out: filters are disconnected.

SPEAKER 1 and 2

Speakers can be turned on and off when properly connected with the accessory McIntosh SPEAKER CONTROL RELAY. The SPEAKER 1 and 2 pushbuttons control the operation of a SPEAKER CONTROL RELAY when it is plugged into the C 29 rear SPEAKER CONTROL RELAY socket.

The SPEAKER CONTROL RELAY controls the audio to two pairs of stereo loudspeakers. The AC power to two AC receptacles on the SPEAKER CONTROL RELAY is controlled by the ON-OFF cycle of the C 29. The total capacity of the SPEAKER CONTROL RELAY AC power receptacles is 2400 watts.

POWER ON

The POWER ON pushbutton shares AC power control, through a current detecting switch circuit, with the AC power switch on a turntable. On the rear panel the TURNTABLE AUTO/MANUAL switch selects the mode of operation.

When the switch is in the AUTO position and a turntable is plugged into one of the green AC power outlets, the AC power to the preamp and to the black AC power outlets can be controlled by the turntable on/off switch. When AC power to the turntable is turned on, automatically the preamplifier and the SWITCHED black AC power outlets are turned on. The system will remain on until the turntable is turned off. The POWER ON pushbutton switch parallels the automatic turntable power control feature. The POWER ON pushbutton is used to turn on and off power when the turntable is not used. The POWER ON pushbutton must be out or off for the turntable to control the AC power.

In the MANUAL position only the POWER ON pushbutton will turn the preamplifier and black outlet AC power on and off.

TAPE RECORDER FRONT PANEL CONNECTION

Input and output facilities are available at the TAPE IN-OUT jacks on the front panel. These front

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panel jacks make connections without having to get at the rear panel. When using the front panel jacks, the rear panel TAPE 2 facilities are disconnected automatically. A metal shielded 1/4 inch stereo phono plug is used for best shielding. Connections follow the industry standards and are tip: left signal, ring: right signal, and, sleeve: common ground.

HEADPHONES

The front panel HEADPHONE jack has been designed to feed low impedance dynamic headphones. Electrostatic headphones generally require higher power than dynamic headphones and are connected to the output terminals on the power amplifier.

Plug headphones into the front panel HEADPHONE jack. Adjust the front panel VOLUME control for comfortable headphone listening. Additional top panel HEADPHONE LEVEL controls also adjust the loudness of the program when using headphones. See the section below for top panel controls.

An amplifier in the C 29 provides the power that feeds both the HEADPHONE jacks on the front panel and the LINE OUTPUT jacks on the rear panel.

PANLOC

McIntosh developed PANLOC mounting brings professional installation technique to stereo. Depressing the PANLOC button will release the instrument. It can then be pulled toward you to the "adjustment" position. In this position the top panel controls can be adjusted.

Top Panel Controls

To gain access to the top panel controls depress the PANLOC buttons and pull the preamplifier out to the adjust position. The controls are now easily operated.

HEADPHONE & LINE OUTPUT

A control has been provided in each channel to adjust the loudness of the program when using headphones. The controls adjust the output in each channel to the HEADPHONE jack only and do not affect the program loudness from the loudspeakers. To adjust for comfortable headphone listening first adjust the VOLUME control to normal room loudness. Then, while wearing the headphones, adjust the HEADPHONE LEVEL controls to the desired loudness level.

MAIN OUTPUT LEVEL

A control has been provided in each channel that adjusts the output of the preamplifier. Use these controls to compensate for minor differences in room effects, loudspeaker efficiency or amplifier gain.

Best stereo performance is achieved when the stereo system is properly balanced. For proper balance each channel must be equal in loudness. Use the top panel level controls to balance system loudness.

This procedure reserves the BALANCE control to adjust for any unbalance in the source material, the record, etc.

Before attempting to balance the system make certain the front panel controls are set properly.

Set the MODE SELECTOR to MONO and the BALANCE control at the center or 12 o'clock position. Turn the tone controls to the center or 12 o'clock position. The HF - LF pushbuttons should be in the OUT position.

With the tuner turned on, turn up the VOLUME control on the front panel until a comfortable room loudness is reached. Adjust the top panel MAIN OUTPUT LEVEL controls until the loudness from each loudspeaker is equal.

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Specifications

PERFORMANCE LIMITS AND RATINGS

We promise you that the C 29 you buy, at the time of your purchase, is capable of performance at or exceeding these limits or you get your money back. McIntosh PERFORMANCE LIMITS are the maximum departure from performance perfection permitted for a McIntosh instrument.

FREQUENCY RESPONSE

+0 −0.5 dB 20 Hz to 20,000 Hz

DISTORTION

.02% maximum at rated output level, 20 Hz to 20,000 Hz

INPUT SENSITIVITY AND IMPEDANCE

AUXiliary, TUNER, TAPE 1, TAPE 2, 0.25 volts at 100,000 ohms; PHono 1 and PHono 2, 2 millivolts (1,000 Hz) at 47,000 ohms and 65 pF; MICrophone, 2.5 millivolts at 10,000 ohms

HUM AND NOISE

AUXiliary, TUNER, TAPE 1, TAPE 2, IHFA 100 dB, unweighted 90 dB below rated output; PHono 1, PHono 2 IHFA 90 dB, unweighted 80 dB below 10 millivolts input, equivalent to less than 1.0 microvolt at the input terminals; MICrophone, 1.5 microvolts at the input terminals.

OUTPUT LEVEL AND IMPEDANCE

MAIN: 2.5 volts with rated input, less than 100 ohms source impedance, to operate into 10,000 ohms or greater

TAPE: 0.25 volts with rated input, less than 200 ohms source impedance, to operate into 10,000 ohms or greater

HEADPHONE/LINE: 0.75 volts into 8 ohm load or 2.5 volts into 600 ohm line, 47 ohm source impedance, level controls provided

VOLTAGE AMPLIFICATION IN DECIBELS

AUXiliary, TUNER, TAPE 1 and TAPE 2	
to MAIN Output	20 dB
to TAPE Output	0 dB
to HEADPHONE/LINE Output	30 dB
PHono 1 and PHono 2 at 1 kHz	
to MAIN Output	62 dB
to TAPE Output	42 dB
to HEADPHONE/LINE Output	72 dB
MICrophone	
to MAIN Output	60 dB
to TAPE Output	40 dB
to HEADPHONE/LINE Output	70 dB

SEMICONDUCTOR COMPLEMENT

9	Integrated Circuits
2	Transistors
11	Silicon Diodes
8	Light Emitting Diodes (LED)
1	Silicon Controlled Rectifier (SCR)
1	Dual Light Dependent Resistor Network (LDR)

POWER REQUIREMENT

120 volts, 50/60 Hz, 45 watts

SIZE: Front Panel measures 16 inches wide (40.6 cm) by 5 7/16 inches high (13.8 cm). Chassis measures 14 3/4 inches wide (37.5 cm) by 4 13/16 inches high (12.2 cm) by 13 inches deep (30.0 cm), including PANLOC shelf and back panel connectors. Knob clearance required is 1 1/4 inches (3.2 cm) in front of the mounting panel.

FINISH: Front panel is anodized gold and black with special gold/teal nomenclature illumination. Chassis is black.

MOUNTING: Exclusive McIntosh developed professional PANLOC

WEIGHT: 21 pounds (9.5 kg) net, 33 pounds (15 kg) in shipping carton.

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Facilities and Features

BASS CONTROLS
Separate 11 position rotary switches for each channel, +20 dB to −20 dB at 20 Hz

TREBLE CONTROLS
Separate 11 position rotary switches for each channel, +18 dB to −18 dB at 20,000 Hz

BALANCE CONTROL
Natural balance at center position, attenuation of left or right channel by rotating control

PRECISE TRACKING VOLUME CONTROL
A precision step volume control with left to right tracking accuracy within 1 dB through its entire range.

SIX SOURCE INPUT SELECTOR
AUXiliary 1 and 2, TUNER, PHono 1 and 2, MICrophone

MODE SELECTOR
Seven positions: Left channel only to both speakers, Right channel only to both speakers, Stereo Reverse, Stereo, Mono, L + R to left speaker only, and L + R to right speaker only

TAPE MONITOR SWITCHES
Two pushbutton switches. Either of two tape recorders can be monitored by selecting the TAPE 1 pushbutton or TAPE 2 pushbutton. They are mechanically interlocked to accept only one pushbutton at the IN position at one time.

TAPE COPY SWITCH
Two pushbutton switches. Either of two tape recorders can be connected to copy from tape recorder 1 to tape recorder 2 or vice versa. They are mechanically interlocked to accept only one pushbutton at the IN position at one time.

LF - HF FILTERS
Reduce unwanted high frequency noise (above 7 kHz) and low frequency rumble etc. (below 50 Hz) at 12 dB per octave rate.

FRONT PANEL TAPE JACKS
Allows connection to input and output of a tape recorder from the front panel. Inserting plugs into the front panel jacks disconnects the TAPE 2 circuits from the rear panel and uses the TAPE 2 facilities for the front panel jacks.

HEADPHONE JACKS
For listening with either low or high impedance dynamic stereo headphones. Power to these jacks is supplied by an amplifier in the C 29. Headphone listening can be accomplished without the use of an external power amplifier.

SPEAKER SWITCHES
(Operates with accessory speaker control relay) Turn two sets of speakers on or off when properly interconnected with the accessory SPEAKER CONTROL RELAY.

MAIN OUTPUT LEVEL CONTROLS
Permits the balance of the entire system to be conveniently preset.

HEADPHONE & LINE OUTPUT LEVEL CONTROLS
Adjusts the level and balance of the HEADPHONE/LINE output.

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Technical Description

AUDIO SECTION

Each channel of the C 29 has four basic sections. They are: phono amplifier, high level amplifier, filter amplifier, and headphone amplifier.

PHONO AMPLIFIER

The phono amplifier uses a high technology integrated circuit operational amplifier. Its differential input stage has been optimized for low noise and low distortion performance. Open loop gain of this integrated circuit is 100,000. With high open loop gain a large amount of negative feedback can be used around the phono amplifier to further reduce noise and distortion. The feedback network also provides precision RIAA frequency compensation. The network uses 1% metal film resistors and 5% poly film capacitors. To achieve low noise performance it is essential that the feedback network be very low impedance. As a consequence, the preamplifier must be capable of operating as a power amplifier to drive this impedance. The actual power output capability of this preamplifier stage is more than 100 milliwatts, a great margin beyond that which is required.

Input sensitivity of the phono amplifier is 2 millivolts. The gain of the amplifier is 42 dB at 1000 Hz. The phono amplifier has a very wide dynamic range. At 1000 Hz the phono input circuit will accept 100 millivolts without overload, a voltage far greater than the output of any current magnetic phono cartridge. Phono input overload therefore is virtually impossible. A signal level of 10 millivolts at the phono input at 1000 Hz will produce 1.2 volts at the tape output. The tape output has a source impedance of 200 ohms, designed to operate into a load impedance of 47,000 ohms or greater.

HIGH LEVEL AMPLIFIER

At the input to the high level amplifier the signal passes through the mode switch, then through the volume control and the loudness control. The loudness control is independent of the volume control permitting any amount of loudness compensation to be introduced regardless of the position of the volume control. The linear high level amplifier has a gain of 20 dB. The same type integrated circuit operational amplifier as used in the phono amplifier is used to minimize noise and distortion in the high level amplifier. The feedback loop around this amplifier uses frequency selective bass and treble networks with two 11 position switches which allow up to 20 dB of boost or cut at 20 Hz and up to 18 dB of boost or cut at 20,000 Hz.

FILTER AMPLIFIER

The filter amplifier serves three functions: a high frequency filter, a low frequency filter and a 20,000 Hz low pass filter. Each channel of the filter amplifier again utilizes the same type operational amplifier as was used in the phono stage and high level amplifier. The resistive and capacitive elements form a 12 dB per octave active RC filter. The high frequency filter is a 7,000 Hz active low pass filter. The low frequency filter is a 50 Hz active high pass filter. The filter amplifier also forms a 20,000 Hz active low pass filter to reduce noise outside the useful sound spectrum while leaving the preamplifier response flat to 20,000 Hz. This low pass filter is connected at all times to reduce wide band noise yet maintaining flat frequency response to 20,000 Hz. The non-linear distortion of the active filter elements in the C 29 is very low even at cutoff frequency. This is not always the case with passive filters that present to the driving source a very low impedance at cutoff frequency.

HEADPHONE AMPLIFIER

The integrated circuit headphone amplifier is capable of driving two pairs of dynamic headphones with less than .1% harmonic distortion. The maximum output of the headphone amplifier is 2.5 volts into 50 ohms or greater. Internal impedance of the headphone amplifier is 47 ohms. Long shielded cables can be used without adversely affecting the frequency response. The headphone level controls adjust the output level and balance of the headphone amplifier.

TURN ON DELAY

The C 29 has transient free turn on and turn off characteristics. A light dependent resistor, time controlled, connects the output of the preamplifier to the output jacks. The control to the resistor is derived from a long time constant that turns on approximately two seconds after the power switch. The same circuit has a short turn off time constant which turns off before the preamplifier's main power supply has a chance to discharge.

AUTO TURN ON

On the rear panel are two green AC power outlets and an AUTO/MANUAL slide switch. Plug the AC power cables from the turntable into the green turntable power outlets on the rear panel. When the switch is in the AUTO position current that is drawn by the turntable will be sensed and will cause a relay to close. This relay controls the AC power to the C 29 and the black AC power outlets. When the current drain ceases the preamplifier and the AC power outlets will turn off. The complete system can be controlled from the turntable off and on switch.

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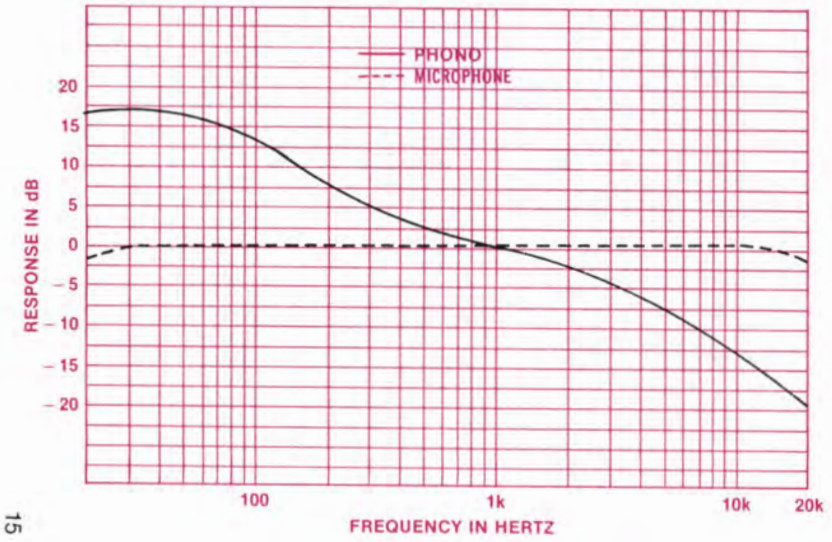
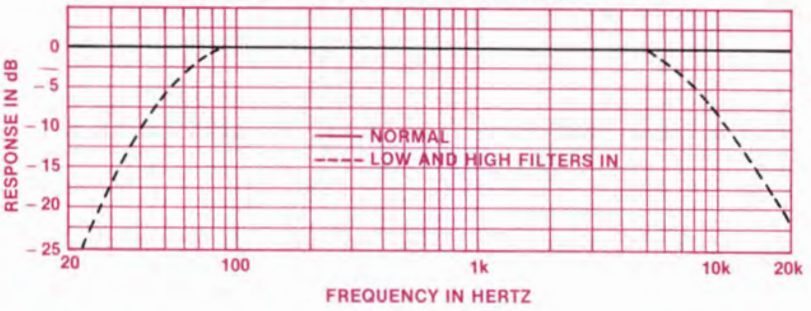
Performance Charts

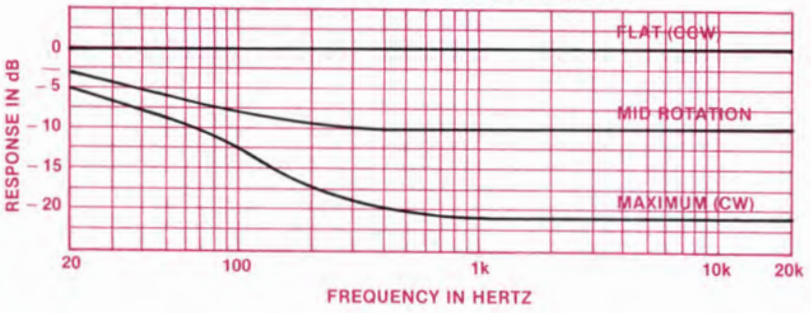
PHONO EQUALIZATION (RIAA) AND MICROPHONE RESPONSE



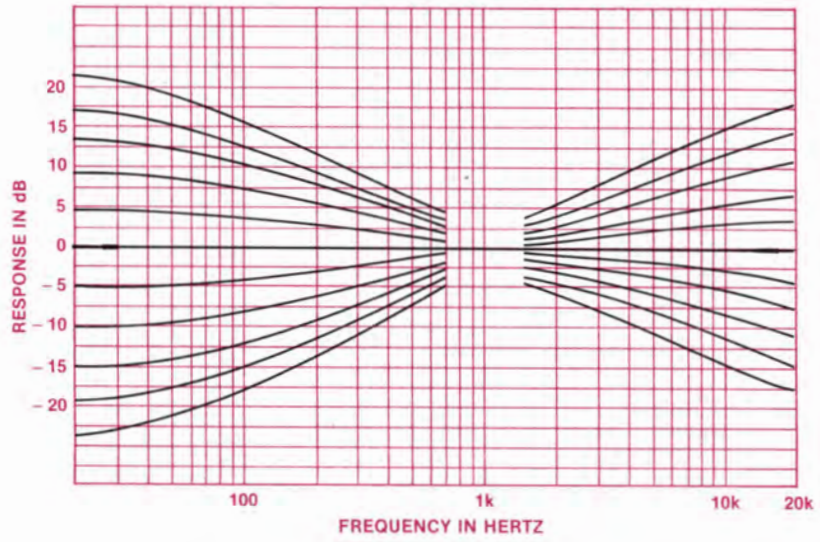
LOW AND HIGH FREQUENCY FILTER CHARACTERISTICS



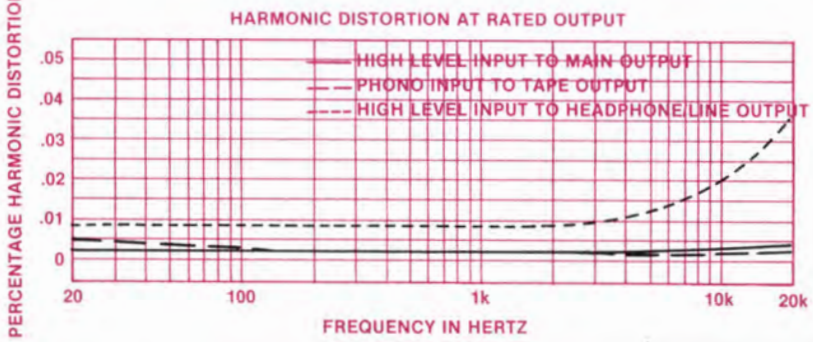
LOUDNESS CONTROL CHARACTERISTICS



BASS AND TREBLE CONTROL CHARACTERISTICS



HARMONIC DISTORTION AT RATED OUTPUT



The front panel POWER ON pushbutton must be left in the off or out position for this automatic control to operate. When the rear panel slide switch is in the manual position, only the front panel pushbutton has control.

POWER SUPPLY

To minimize hum pickup and thus improve signal to noise ratio the C 29 power transformer is triple shielded. Shielding includes a copper strap, a silicon steel strap, and a steel outer shell. The transformer output voltage is fed to a full wave bridge rectifier with 3,000 microfarad filter capacitors to provide the +24 volts for powering the headphone amplifier and the plus voltage regulator and −24 volts for the minus regulator. The ±18 volts needed for low level and operational amplifier stages is controlled with integrated circuit voltage regulators.

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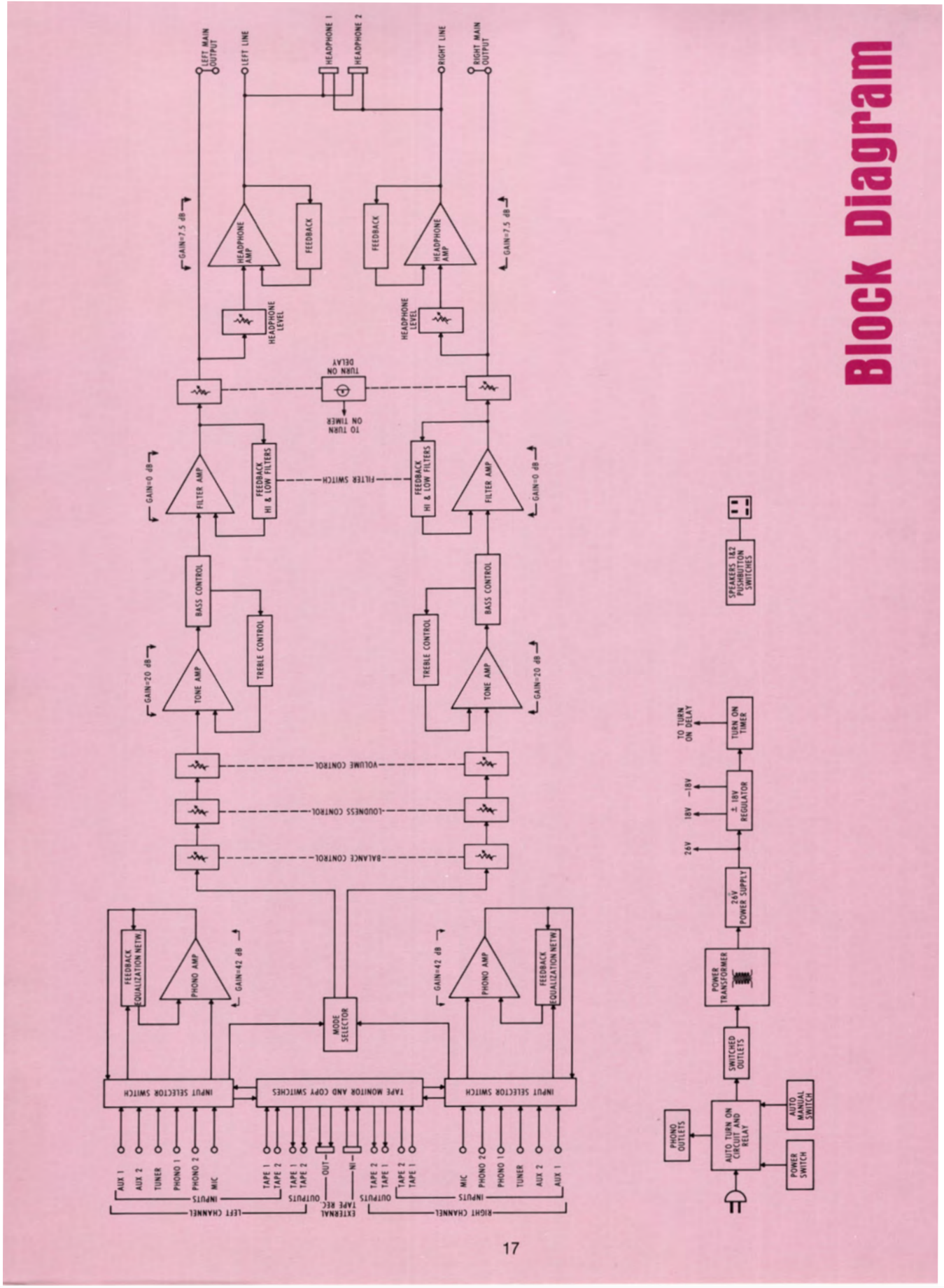
Block Diagram



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